REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1 and 3-6 are pending in the application. Claim 1 is amended by the present amendment. Support for amended Claim 1 can be found in the original specification, claims and drawings.[1] No new matter is presented.

In the outstanding Office Action, Claims 1 and 3-6 were rejected under 35 U.S.C. § 103(a) as unpatentable over Hongo et al. (U.S. Pub. 2003/0053552, herein Hongo) in view of Wright et al. (U.S. Pat. 7,260,365, herein Wright).

In response to the rejection based on Hongo and Wright, Applicants respectfully submit that independent Claim 1 recites novel features clearly not taught or rendered obvious by the applied references.

Amended independent Claim 1 relates to a transmitter which detects distortion components produced by a power amplifier, and uses the detected distortion components in predistorters to produce a compensation signal to cancel the distortion components at the power amplifiers.

As described in an exemplary embodiment at Fig. 4, the claimed transmitter includes an input-side digital multi-port directional coupler 13 configured to divide and combine digital transmission signals of N-channels, and output N-combined signals to N transmission paths. N predistorters 21 are inserted in the N transmission paths, respectively, and provide compensating predistortions to the N-combined signals outputted from the input-side digital multi-port directional coupler 13. The transmitter also includes N transmitting parts 30, which are inserted in the N transmission paths, respectively, and convert output signals from the N predistorters 21 to N high-frequency signals, each of the N transmitting parts including

[1] e.g., specification, p. 3, ll. 2-11.

a power amplifier 33 for amplifying power of the high-frequency signal. An output-side multi-port power combiner 40 divides and combines the N high-frequency signals to output N high-frequency transmission signals. N receiving parts 50 are configured to extract, from said N high-frequency signals, distortion components produced by the power amplifiers and generate, based on said distortion components, compensating signals which control said N predistorters. Based on the compensating signals, N predistorters generate compensating predistortions and impart said compensating predistortions to said N-combined signals from said input-side digital multi-port directional coupler, respectively, to cancel the distortion components at said power amplifiers.

Turning to the applied references, Hongo, the primary reference, describes a distortion compensator used to compensate for distortion produced in an amplifier.

Hongo, however, fails to disclose the use of either the input-side multi-port directional coupler or output-side multi-port directional coupler, as recited in independent Claim 1.

In Hongo, an input signal containing signals of a plurality of different frequency bands is frequency-divided into respective frequency-band signals by a frequency band divider 1, each of the frequency band signals is subjected to predistortion by a distortion compensator 2, and then the plural predistorted frequency band signals are combined by a frequency band combiner 3 into a combined signal which in turn is amplified by an amplifier 4. It is apparent that the frequency band divider acts as a filter for separating plural frequency band signals from one another.

Thus, in Hongo, an amplifier is not provided on any of the predistortion paths for frequency-band-divided signals, rather an amplifier is provided on a combined signal path on the output side of the frequency band combiner 3. The function of the frequency band divider 1 in Hongo completely differs from that of the input-side multi-port directional coupler, as recited in independent Claim 1.

In the present invention, the input-side multi-port directional coupler distributes an input signal at each of its N input ports to its N output ports and the N distributed signals at each output port are outputted as a combined signal to corresponding one of the N transmission paths between the input-side multi-port directional coupler 13 and the output-side multi-port directional coupler 40. As explained previously, since the input-side multi-port directional coupler 13 distributes an input signal at each of N input ports of the coupler to N output ports of the coupler, a signal on each transmission path contains all components of the N input signals. The function of the multi-port directional coupler itself is well known to those skilled in the art. According to the present invention, the signal on each of the N transmission paths is subjected to predistortion and then supplied to the power amplifier, the outputs of the amplifiers on the N transmission paths are supplied to the output-side multi-port directional coupler 40.

The function of the output-side multi-port directional coupler 40 is substantially similar to that of the input-side multi-port directional coupler 13 as described in an exemplary embodiment at Figs. 2A and 2B and their corresponding description. That is, a signal at each of N input ports of the coupler 13 is distributed to N output ports of the coupler 13, thus outputting a combined signal from each output port. As explained in the present specification, each of the signals from the N output ports of the coupler 40 corresponds to one of the N input signals at the N input ports of the coupler 13.

Accordingly, the claimed multi-port directional coupler completely differs from either frequency band divider or frequency band combiner employed in Hongo. More specifically, Hongo fails to teach or suggest a transmitter comprising "an input-side digital multi-port directional Butler matrix coupler configured to divide and combine digital transmission signals of N channels by digital processing and configured to output N-combined signals to N transmission paths, respectively... and an output-side multi-port Butler matrix directional

coupler configured to divide and combine said N high-frequency signals to output N high-frequency transmission signals," as recited in independent Claim 1.

Wright, the secondary reference, relates to a digital predistortion linearizer, wherein a digital baseband signal is subjected to predistortion and then to DA conversion, and the resultant analog predistorted baseband signal is up-converted and then supplied to an amplifier. The output of the amplifier is down-converted to a baseband signal which in turn is converted to a digital signal to be used for controlling the predistortion, thereby compensating for a distortion produced by the amplifier.

Wright, however, does not disclose any multi-port configuration and therefore fails to cure the above noted deficiencies of Hongo.

Accordingly, for at least the reasons discussed above, Applicants respectfully request the rejection of Claims 1 and 3-6 under 35 U.S.C. § 103 be withdrawn.

Consequently, in view of the present amendment and in light of the foregoing comments, it is respectfully submitted that the invention defined by Claims 1 and 3-6 is patentably distinguishing over the applied references. The present application is therefore believed to be in condition for formal allowance and an early and favorable action is therefore requested.

Respectfully submitted,

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